

# I CLAIM

1. In an artificial sensing system comprising producing first signals corresponding to light and dark portions of a particular object to be sensed and conveying to the nervous system of the subject second signals producing sensations in said nervous system corresponding at least in part to said object; the improvement which comprises converting light-corresponding and dark-corresponding portions of said first signal into dark-corresponding and light-corresponding portions respectively of said second signal.

2. In an artificial sensing system in which a particular object is sensed and at least some light and dark portions of said object are converted into signals which are conveyed to the nervous system of a subject to produce sensations corresponding at least in part to said object; the improvement which comprises sensing light and dark portions of said object and causing said sensation-producing signals to represent an inversion of said light and dark portions of said object into dark and light portions thereof respectively.

3. In an artificial sensing system in which a particular object is sensed and at least some portions of said object are converted into electrical signals which are conveyed to the nervous system of a subject to produce phosphenes corresponding at least in part to said object; the improvement which comprises causing the phosphenes produced by said signals to produce in said subject's brain a comparatively bright outline of the image of said object

when compared to the produced image of the remaining portion of said object.

4. In an artificial sensing system comprising creating a plurality of sensations in the nervous system of the subject corresponding to a particular object to be viewed by stimulating a corresponding plurality of electrodes electrically connected respectively to appropriate locations of the subject's nervous system; the improvement which comprises, for a given view of said object, providing for each of a plurality of selected electrodes a given signal comprising a plurality of time-spaced pulses, and applying those pulses to those electrodes through a multiplexer effective to accept a given signal, convert said signal to a plurality of pulses for each selected electrode, and apply the first of those pulses sequentially to said electrodes, then the second of those pulses sequentially to said second electrode, and so on.

5. In an artificial sensing system comprising creating a plurality of sensations in the nervous system of the subject corresponding to a particular object to be viewed by stimulating a corresponding plurality of electrodes electrically connected respectively to appropriate locations of the subject's nervous system; the improvement which comprises, for a given view of said object, providing for each of a plurality of selected electrodes a given signal comprising a plurality of time-spaced pulses, and applying those pulses to those electrodes through a multiplexer effective to accept a given signal, converting said signal to a

plurality of pulses for each selected electrode, and applying those pulses sequentially to said electrodes one electrode at a time, a first pulse being applied sequentially to one electrode at a time, a second pulse then being applied sequentially to one electrode at a time, and so on.

6. In an artificial sensing system comprising creating in the nervous system of a subject sensations corresponding to a particular object to be viewed, thereby to produce for said subject a sensed representation of that object; the improvement which comprises providing the subject with a rangefinder effective to detect the distance from the subject to said object and indicate to the subject what that distance is by causing the stimulation produced in the subject to sensibly reflect said distance, thereby conveying distance-intelligence to said subject while at the same time conveying to said subject a visual representation of the object in question.

7. The artificial sensing system of Claim 6 in which said variation in stimulation is constituted by essentially blinking said stimulation on and off at a rate corresponding to said distance.

8. To assist in the monitoring of an artificial sensing system which creates sensations in the nervous system of the subject corresponding to a particular object to be viewed by providing the subject with a camera which produces signals corresponding to the object to be viewed which are converted into sensations in the subject's nervous system; the improvement which

comprises providing said subject with a device producing a beam of light corresponding in direction to the direction in which said camera is pointed, thereby enabling those monitoring the actions of said subject to know what the camera is looking at any given moment.

9. To assist in the monitoring of an artificial sensing system which creates sensations in the nervous system of the subject corresponding to a particular object to be viewed by providing the subject with a camera which produces signals corresponding to the object to be viewed which are converted into sensations in the subject's nervous system; the improvement which comprises a display device which produces simultaneously viewable representations of (a) what the camera sees when viewing a particular object and (b) a map representing the sensations then being present in the subject's nervous system.

10. To assist in the monitoring of an artificial sensing system which creates sensations in the nervous system of the subject corresponding to a particular object to be viewed by selectively stimulating a plurality of electrodes electrically connected respectively to appropriate locations in the subject's nervous system and producing, when thus stimulated, one or more sensations in particular locations in the subject's field of consciousness; the improvement comprising (a) energizing two selected electrodes to produce two separated reference sensations, (b) then, while keeping said reference sensations sensed by the subject, individually sequentially energizing additional electrodes

to sequentially produce additional sensations each corresponding respectively to the electrode then being energized, (c) for each such additional sensation obtaining from the subject an estimate of the relative position of said additional sensation relative to said referenced sensations, and (d) mapping the estimated positions of said sensations.

11. To assist in the monitoring of an artificial sensing system which creates sensations in the nervous system of the subject corresponding to a particular object to be viewed by selectively stimulating a plurality of electrodes electrically connected respectively to appropriate locations in the subject's nervous system and producing, when thus stimulated, one or more sensations in a particular location in the subject's field of consciousness; the improvement comprising (a) energizing two selected electrodes to produce two separated reference sensations to define a reference line, (b) then, while keeping said reference sensations sensed by the subject, individually sequentially energizing additional electrodes to sequentially produce additional sensations each corresponding respectively to the electrode then being energized, (c) for each such additional sensation obtaining from the subject an estimate of the vertical spacing of each additional sensation relative to the two referenced sensations and an estimate of the distance of said additional sensation to one side or the other of said reference line, and (d) mapping the estimated positions of said sensations.

12. In an artificial sensing system comprising creating a plurality of sensations in the nervous system of the subject corresponding to a particular object to be viewed by producing a series of signals corresponding to the object to be viewed and converting those signals into sensations in the subject's nervous system; the improvement which comprises providing a variable signal amplifier active on said signals before they are converted into sensations, and varying the degree of signal amplification thus produced, thereby to vary the area of said object producing said sensations and thus giving rise to a "zoom" effect.

13. The artificial sensing system of Claim 12 in which the variation in said magnification is under the control of the subject.

14. In an artificial sensing system which creates sensations in the nervous system of the subject corresponding to a particular object to be viewed by providing the subject with a device which produces a signal corresponding to an object to be viewed and circuitry conveying said signals to electrodes connected to particular areas of the subject's nervous system, thereby to produce sensations in said nervous system; the improvement which comprises obtaining from said device a first signal corresponding to said object, feeding said first signal through a link and thence through a sub-notebook computer, feeding the output of the sub-notebook computer to a micro-controller and amplifying the output of the latter to electrodes corresponding to phosphene positions in the subject's brain.

15. In the artificial sensing system of Claims 1, electromagnetically coupling an output of said sub-notebook computer to a visual display device and thus creating a visible representation of said object.

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